

INTRODUCTION TO FUNCTIONS

ALGEBRA 2 WITH TRIGONOMETRY

Most higher level mathematics is built upon the concept of a function. Like most of the important concepts in mathematics, the definition of a function is simple to the point of being easily overlooked. Make sure to know the following definition:

DEFINITION: A **function** is any “rule” that assigns exactly one output value (y -value) for each input value (x -value). These rules can be expressed in different ways, the most common being equations, graphs, and tables of values. We call the input variable **independent** and output variable **dependent**.

Exercise #1: An internet music service offers a plan whereby users pay a flat monthly fee of \$5 and can then download songs for 10 cents each.

(a) What are the independent and dependent variables in this scenario?

Independent:

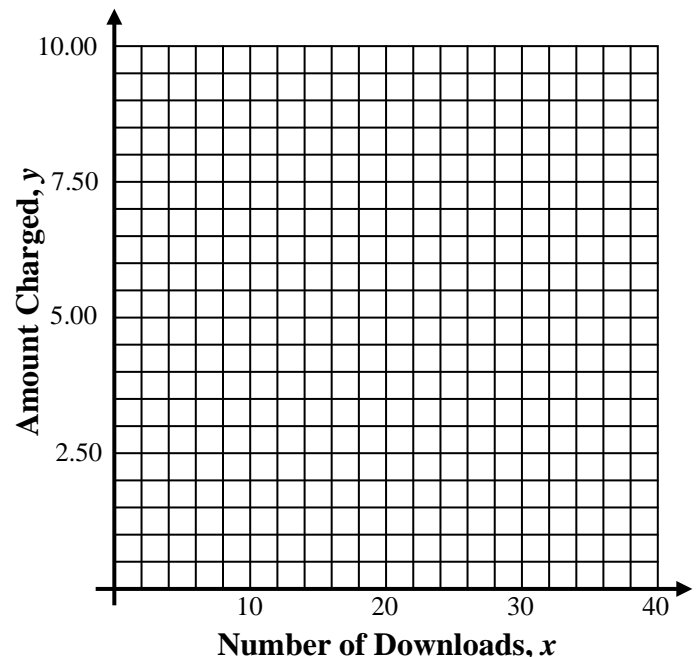
Dependent:

(b) Fill in the table below for a variety of independent values:

Number of downloads, x	0	5	10	20
Amount Charged, y				

(c) Let the number of downloads be represented by the variable x and the amount charged be represented by the variable y , write an equation that models y as a function of x .

(d) Based on the equation you found in part (c), produce a graph of this function for all values of x on the interval $0 \leq x \leq 40$. Use your calculator to generate additional coordinate pairs to the ones you found in part (b).



Exercise #2: One of the following graphs shows a relationship where y is a function of x and one does not.

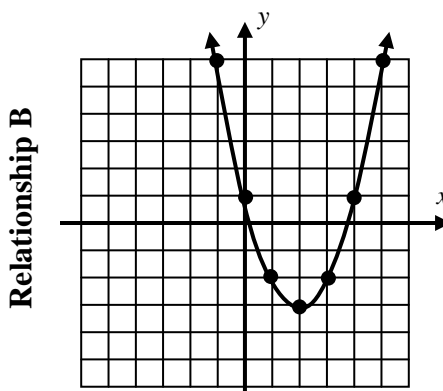
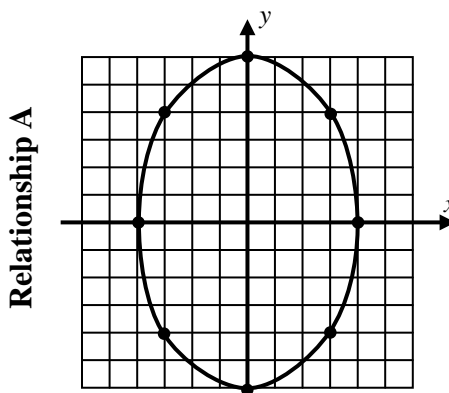
(a) Draw the vertical line whose equation is $x = 3$ on both graphs.

(b) Give all output values for each graph at an input of 3.

Relationship A:

Relationship B:

(c) Explain which of these relationships is a function and why.



Exercise #3: The graph of the function $y = x^2 - 4x + 1$ is shown below.

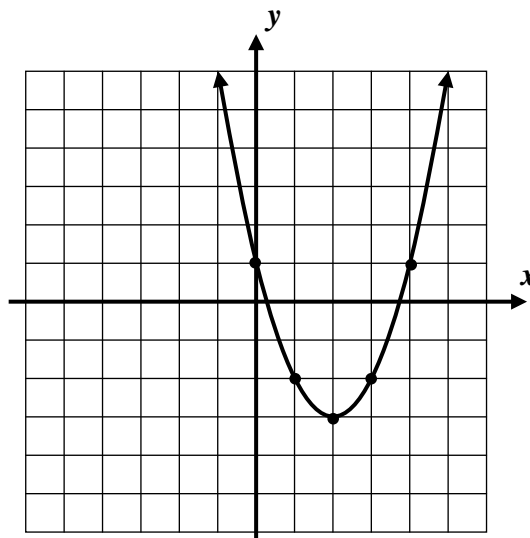
(a) State this function's y -intercept.

(b) Between what two consecutive integers does the larger x -intercept lie?

(c) Draw the horizontal line $y = -2$ on this graph.

(d) Using these two graphs, find all values of x that solve the equation below:

$$x^2 - 4x + 1 = -2$$



(e) Verify that these values of x are solutions by using **STORE** on your graphing calculator.



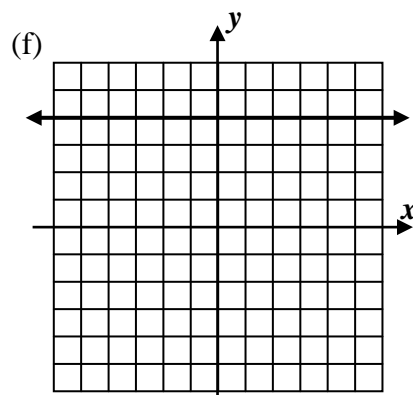
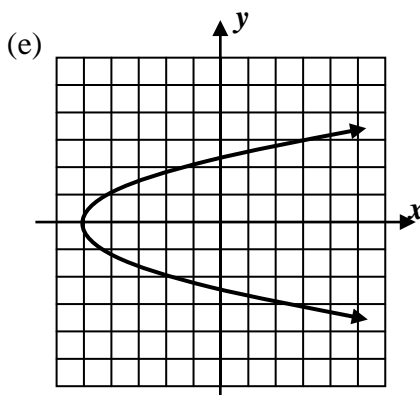
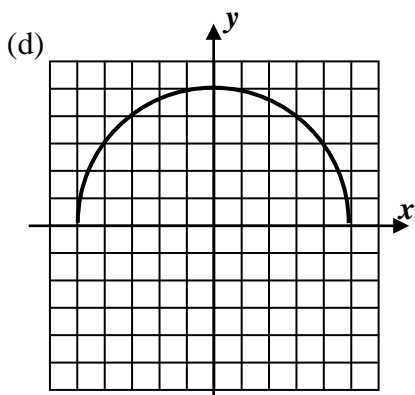
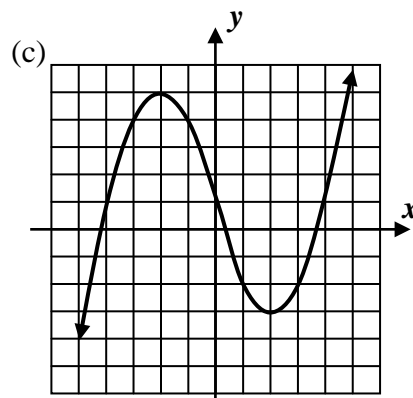
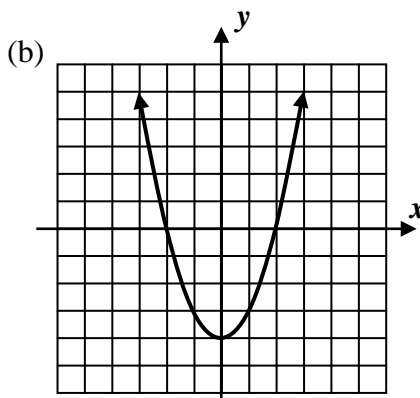
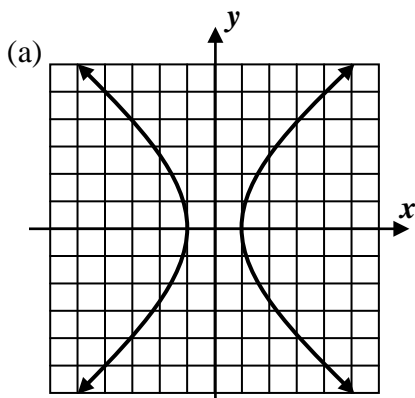
Name: _____

Date: _____

INTRODUCTION TO FUNCTIONS ALGEBRA 2 WITH TRIGONOMETRY - HOMEWORK

SKILLS

1. Determine for each of the following graphed relationships whether y is a function of x using the Vertical Line Test.



2. What are the outputs for an input of $x = 5$ given functions defined by the following formulas:

(a) $y = 3x - 4$

(b) $y = 50 - 2x^2$

(c) $y = 2^x$



APPLICATIONS

3. Evin is walking home from the museum. She starts 38 blocks from home and walks 2 blocks each minute. Evin's distance from home is a function of the number of minutes she has been walking.

(a) Which variable is independent and which variable is dependent in this scenario?

(b) Fill in the table below for a variety of time values.

Time, t , in minutes	0	1	5	10
Distance from home, D , in blocks				

(c) Determine an equation relating the distance, D , that Evin is from home as a function of the number of minute, t , that she has been walking.

(d) Determine the number of minutes, t , that it takes for Evin to reach home.

REASONING

4. In one of the following tables, the variable y is a function of the variable x . Explain which relationship is a function and why the other is not.

x	y
-2	11
0	7
2	11
4	23
6	43

Relationship #1

x	y
0	0
1	-1
1	1
4	-2
4	2

Relationship #2

